(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 458 697 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(21) Application number: **24160221.8**

(22) Date of filing: **28.02.2024**

(51) International Patent Classification (IPC):
B65B 19/34 *(2006.01)* ***B31D 5/00*** *(2017.01)*
B65B 9/04 *(2006.01)* ***B65B 41/12*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B65B 19/34; B31D 5/0095; B65B 9/045;
B65B 25/00; B65B 41/12; B65B 61/205;
B65B 2009/047; B65B 2220/06

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority: **01.03.2023 IT 202300003651**

(71) Applicant: **G.D S.p.A.**
40133 Bologna (IT)

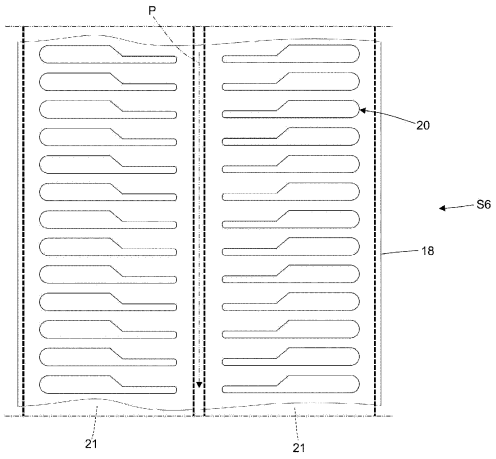
(72) Inventors:
- **FAZZIOLI, Fabrizio**
  40133 Bologna (IT)
- **FORTINI, Massimo**
  40133 Bologna (IT)

(74) Representative: **Studio Torta S.p.A.**
Via Viotti, 9
10121 Torino (IT)

(54) METHOD AND MACHINE FOR WRAPPING STRAWS

(57) Method and machine (6) for wrapping straws (1) providing: a preferably rotating wrapping conveyor (18) configured to advance, along a wrapping path (P), two seats (20) that are arranged side by side and are each suitable for housing a straw (1); a first feeding station (S6), which is arranged along the wrapping path (P) and is configured to feed into each seat (20) a portion of a first continuous web (21) of wrapping material that is arranged folded in a "U" shape inside the seat (20) to define a pocket; a transfer station (S5), which is arranged downstream of the first feeding station (S6) along the wrapping path (P) and is configured to transfer into each seat (20) a straw (1) that is placed inside a respective pocket; and a second feeding station (S7), which is arranged downstream of the transfer station (S5) along the wrapping path (P) and is configured to feed over each seat (20) a second continuous web (24) of wrapping material that closes each pocket containing a respective straw (1) thus completing the formation of a respective wrap (5). The first feeding station (S6) is configured to feed two first continuous webs (21) that are separated from one another and arranged side by side so that a first continuous web (21) is arranged at a right seat (20) and the other first continuous web (21) is arranged at a left seat (20).

Fig. 4



EP 4 458 697 A1

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian patent application no. 102023000003651 filed on March 1st, 2023, the entire disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates to a method and to a machine for wrapping straws.

PRIOR ART

[0003] Straws are known which have a corrugated intermediate portion aimed to allow the bending of the straw in order to assume, in use, a more suitable shape to satisfy the user.

[0004] For some applications, a straw is individually packaged (namely, it is inserted singularly in its own wrap) after being bent in a "U" shape (i.e., by 180°) in the area of the corrugated intermediate portion (the purpose of the "U" bending is to reduce the overall dimensions of the straw); typically, it is required to individually package the straws bent in a "U" shape when the straws must be fixed (glued) to the rear wall of a beverage container.

[0005] A known wrapping machine for individually packaging straws comprises: a hopper containing a mass of straws, a pick-up drum that picks up the straws from the hopper, a bending drum that bends each straw, and a wrapping drum, which has a plurality of suitable sucking seats each designed to house a portion of a first continuous (i.e., seamless) web of wrapping material and a straw. Each sucking seat of the wrapping drum receives a portion of the first web of wrapping material that is arranged folded in a "U" shape inside the sucking seat to define a pocket and therefore receives subsequently and directly from the bending drum a straw (which is placed inside the pocket). An applicator drum is coupled to the wrapping drum, which applies (typically by heat sealing) to the first web of wrapping material a second web of wrapping material that closes the pockets containing the straws. Then, a continuous (i.e., seamless) succession of pockets each containing a straw is fed out of the wrapping drum; said continuous succession of pockets, each containing a straw, is referred to as a "*cartridge belt*" in jargon.

[0006] To increase (in effect double) the hourly productivity of the wrapping machine, it is known to produce the wrapping machine with a double line so as to perform all the operations simultaneously on two straws arranged side by side.

[0007] Recently, to increase environmental sustainability, it has been proposed to eliminate the use of plastic in the production and packaging of straws and consequently both the production of straws in compostable material and the packaging of straws in paper-based wraps have begun. That is, the two continuous webs into which the straws are inserted are made of a paper-based wrapping material. However, it has been observed that by using continuous webs of paper-based wrapping material and operating at a high operating speed (measured as the number of wrapped straws per unit of time), more or less partial tearing of a web occurs relatively frequently thus determining, in the best case scenario, the formation of one or more unsealed and therefore defective packages (namely, to be discarded) or determining, in the worst case scenario, the stopping of the wrapping machine to request the manual intervention of an operator to restore the continuity of the web.

[0008] Patent application WO2021250715A1 describes a machine for wrapping straws comprising a feeding unit configured to feed a plurality of paper straws towards different working units configured to automatically perform different processes on the straws, comprising a deformation in order to form a bellows, a cutting, following the deformation, to create a pointed end cut obliquely, a bend in the area of the bellows, and a packaging of each straw.

DESCRIPTION OF THE INVENTION

[0009] The object of the present invention is to provide a method and a machine for wrapping straws which allow, by working on a double line, to maintain a high operating speed (measured as the number of wrapped straws in a unit of time) without interruptions (namely, without unexpected stops) and, at the same time, to reduce defective packaging to a minimum even when continuous webs of paper-based wrapping material are used.

[0010] According to the present invention, a method, and a machine for wrapping straws are provided, as stated in the attached claims.

[0011] The claims describe preferred embodiments of the present invention and form an integral part of the present description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The present invention will now be described with reference to the attached drawings, which illustrate some non-limiting embodiments thereof, wherein:

- Figure 1 is a perspective view of a straw applied to a beverage package;
- Figure 2 is an enlarged scale view of the straw of Figure 1;
- Figure 3 is a schematic front view of a wrapping machine that bends and wraps the straw of Figure 1;
- Figure 4 is a schematic view of a portion of a wrapping drum of the wrapping machine of Figure 3 at a feeding station of a first web of wrapping material;
- Figure 5 is a schematic view of a portion of the wrap-

ping drum of Figure 4 at a feeding station of a second web of wrapping material;

- Figure 6 is a perspective and schematic view of part of a feeding unit for a web of wrapping material; and
- Figure 7 is a perspective and schematic view of a different embodiment of the feeding unit of Figure 6.

PREFERRED EMBODIMENTS OF THE INVENTION

[0013] In Figure 1, number 1 denotes as a whole a straw (made of paper or plastic) which is applied to the back of a beverage package. The straw 1 has a flat end 2 (which is held by the lips of the user) and a pointed end 3 (to more effectively break through the cap that seals a dispensing opening of the package).

[0014] Furthermore, the straw 1 has a corrugated intermediate portion 4 in the area of which the straw 1 can be bent easily and without breaking (namely, in an elastic manner) so as to assume, in use, the most suitable shape in order to satisfy the user.

[0015] The straw 1 is individually packaged (namely, it has been inserted singularly in its own wrap 5 not illustrated in Figure 1 and illustrated in Figure 2) after being bent in a "U" shape (i.e., by 180°) in the area of the corrugated intermediate portion 4 (the purpose of the "U" bending is to reduce the overall dimensions of the straw 1 so as to remain within the overall dimensions of the back wall of the package to which the straw 1 is applied).

[0016] In Figure 3, number 6 denotes as a whole a wrapping machine which receives the straight straws 1 from a processing machine (not illustrated), corrugates the straws 1, bends the straws 1 in a "U" shape, and inserts the straws 1 in corresponding wraps 5.

[0017] The wrapping machine 6 comprises a hopper 7 which is designed to contain a mass of straight straws 1 coming from the wrapping machine and which move progressively downwards by gravity, namely, towards the bottom of the hopper 7. As an alternative to the hopper 7, the wrapping machine 6 could provide any buffer or collector of a mass of straws. As a further alternative, the wrapping machine 6 could receive the straws in an orderly manner (that is, not collected in a mass), for example directly from the processing machine.

[0018] On the bottom of the hopper 7 a pick-up conveyor 8 is provided, which, in an input station S1 picks up a succession of straight straws 1, advancing the same transversally to (namely, perpendicularly to a longitudinal axis of the straws 1). According to a preferred embodiment illustrated in the attached figures, the pick-up conveyor 8 is formed by a drum which is mounted so as to rotate around a rotation axis 9 (horizontal and perpendicular to the plane of Figure 3) and has a plurality of sucking seats each suitable for housing a corresponding straight straw 1. According to a different embodiment not illustrated, the pick-up conveyor 8 is a conveyor belt, namely, it comprises a flexible belt which is closed in a loop around two end pulleys and supports a plurality of sucking seats each suitable for housing a corresponding straight straw 1.

[0019] The wrapping machine 6 comprises a corrugator drum 10 which is mounted so as to rotate around a rotation axis 11 (parallel to the rotation axis 9), has a plurality of seats each suitable for housing a corresponding straight straw 1, and receives the straight straws 1 directly from the pick-up conveyor 8 in a transfer station S2. A corrugator device 12 is arranged along the periphery of the corrugator drum 10, which corrugates the straight straws 1, namely, forms the corrugated intermediate portion 4 in each straight straw 1.

[0020] According to an embodiment not illustrated, the wrapping machine 6 could receive already corrugated straws 1; in this case, the wrapping machine 6 does not comprise the corrugator drum 10.

[0021] The wrapping machine 6 comprises a bending drum 13 which is mounted so as to rotate around a rotation axis 14 (parallel to the rotation axis 11), has a plurality of seats each suitable for housing a corresponding initially straight straw 1, and receives the straight straws 1 directly from the corrugator drum 10 in a transfer station S3. Bending elements 15 are arranged around the rotation axis 14 in a fixed position (namely, integral with a frame of the wrapping machine 6 and therefore devoid of movement) which are coupled to the bending drum 13 and interact with the straws 1 carried by the seats so as to bend the straws 1 in a "U" shape.

[0022] The wrapping machine 6 comprises a reject drum 16 which is mounted so as to rotate around a rotation axis 17 (parallel to the rotation axis 14), has a plurality of seats each suitable for housing a corresponding straw 1 bent in a "U" shape, receives the straws 1 directly from the bending drum 13 in a transfer station S4, and releases the bent straws 1 in a transfer station S5 arranged downstream of the transfer station S4 relative to the rotation direction of the reject drum 16.

[0023] The wrapping machine 6 comprises a wrapping drum 18, which is mounted so as to rotate around a rotation axis 19 (parallel to the rotation axis 18), has a plurality of sucking seats 20 (illustrated in Figures 4 and 5) each suitable for housing a portion of a continuous (i.e., seamless) web 21 of wrapping material and a straw 1 bent in a "U" shape. The rotation of the wrapping drum 18 around the rotation axis 19 cyclically advances the sucking seats 20 along a circular wrapping path P. According to a different embodiment not illustrated, the wrapping drum 18 is replaced by a conveyor belt comprising a flexible belt which is closed in a loop around two end pulleys and supports a plurality of sucking seats 20 each suitable for housing a corresponding straw 1 bent in a "U" shape; in this embodiment, the wrapping path P is at least partially straight.

[0024] Each sucking seat 20 of the wrapping drum 18 receives, in a feeding station S6, a portion of the continuous web 21 of wrapping material that is arranged folded in a "U" shape inside the sucking seat 20 to define a pocket (which will become a respective wrap 5) and then receives subsequently and directly from the reject drum

17 in the transfer station S5 a bent straw 1 (which is placed inside the pocket previously formed in the sucking seat 20). Coupled to the wrapping drum 18 is an applicator drum 22, which is mounted so as to rotate around a rotation axis 23 (parallel to the rotation axis 19) and applies to the continuous web 21 of wrapping material, and in a feeding station S7, a continuous web of wrapping material 24 that closes the pockets containing the bent straws 1 (thus completing the formation of the respective wraps 5). That is, each wrap 5 is formed by the union of a portion of a continuous web 21 (having a cradle-like shape) with a portion of a continuous web 24 (having a flat shape to form the "*lid*" for the cradle). Therefore, a continuous succession (i.e., seamless) of wraps 5, each containing a bent straw 1, is fed out of the wrapping drum 18; said continuous succession of pockets each containing a bent straw 1, is referred to as a "*cartridge belt*" in jargon.

[0025] The wrapping machine 6 comprises an output conveyor 25, which receives the "*cartridge belt*" (namely, it receives a continuous web 5 of wrapping material containing respective bent straws 1) from the wrapping drum 18 and moves the "*cartridge belt*" towards an output of the wrapping machine 6.

[0026] Preferably, the whole wrapping machine 6 operates with a law of continuous motion, namely, with movements at a normally constant speed (when the productivity of the wrapping machine 6 is stable or in steady state and therefore not transitory).

[0027] The wrapping machine 6 operates on a double line, namely, it treats two straws 1 arranged side by side (that is, axially aligned with one another) at a time. In other words, the pick-up conveyor 8 has a series of pairs of sucking seats (axially aligned with one another) to pick up two straws 1 at a time from the output mouth of the hopper 7, the corrugator drum 10 has a series of pairs of seats (axially aligned with one another), which simultaneously receive two straight straws 1 from the pick-up conveyor 8, simultaneously corrugate two straws 1 together with the corrugator device 12, and simultaneously release two straight straws 1 to the bending drum 13. In turn, the bending drum 13 has a series of pairs of seats (axially aligned with one another or arranged side by side and aligned along a direction perpendicular to an advancement direction of the bending drum 13) which simultaneously receive two straight straws 1 from the corrugator drum 10, simultaneously bend two straws 1, and simultaneously release two bent straws 1 to the reject drum 16. In turn, the reject drum 16 has a series of pairs of seats (axially aligned with one another) which simultaneously receive two bent straws 1 from the bending drum 13 and simultaneously release two bent straws 1 to the wrapping drum 18. In turn, the wrapping drum 18 has a series of pairs of sucking seats 20 (axially aligned with one another), which simultaneously receive two bent straws 1 from the reject drum 16, simultaneously form two wraps 5 (operating with respective continuous webs 21 and 24 of wrapping material), and simultaneously release two wraps 5 to the output conveyor 25. In turn, the output conveyor 25 has a series of pairs of sucking seats (axially aligned with one another) which simultaneously receive two wraps 5 (and therefore two "*cartridge belts*") from the wrapping drum 18.

[0028] In other words, the wrapping drum 18 (namely, the rotating wrapping conveyor) moves, along the circular wrapping path P, a series of pairs of sucking seats 20 which are arranged side by side and are each suitable to house a straw 1. In the feeding station S6 arranged along the wrapping path P, in each sucking seats 20 a portion of the continuous web 21 of wrapping material is fed, which is arranged bent in a "U" shape inside the sucking seat 20 so as to define a pocket. In the transfer station S5 arranged downstream of the feeding station S6 along the wrapping path P, a straw 1 bent in a "U" shape is transferred to each sucking seat 20 and placed inside a respective pocket. Finally, in the feeding station S7 arranged downstream of the transfer station S5 along the wrapping path P, the continuous web 24 of wrapping material is fed over each sucking seat 20 which closes each pocket containing a respective straw 1 (thus completing the formation of the respective wrap 5).

[0029] According to a preferred, but not binding, embodiment, the hopper 7 contains straight straws 1 having a double length (namely, equal to double the length of a straw 1 coming out of the wrapping machine 6) which are cut in half by a cutting device 26 coupled to the pick-up conveyor 8.

[0030] As illustrated in Figure 4, two continuous twin webs 21 (namely, completely identical to one another) are fed into the feeding station S6, which are separated from one another and arranged side by side so that a continuous web 21 is arranged at the sucking seats 20 located on the right and the other continuous web 21 is arranged at the sucking seats 20 located on the left. That is, considering a single pair of sucking seats 20 axially side by side, a continuous web 21 is arranged at a right sucking seat 20 and the other continuous web 21 is arranged at a left sucking seat 20.

[0031] Similarly, and as illustrated in Figure 5, two continuous twin webs 24 (namely, completely identical to one another) are fed in the feeding station S7, which are separated from one another and arranged side by side so that a continuous web 24 is arranged at the sucking seats 20 located on the right and the other continuous web 24 is arranged at the sucking seats 20 located on the left. That is, considering a single pair of sucking seats 20 axially side by side, a continuous web 24 is arranged at a right sucking seat 20 and the other continuous web 24 is arranged at a left sucking seat 20.

[0032] According to a possible embodiment illustrated in Figure 6, the two continuous webs 21 are unwound from two separate and independent reels 27 and similarly the two continuous webs 24 are unwound from two separate and independent reels 28.

[0033] According to an alternative embodiment illustrated in Figure 7, a single continuous web 21 having a

double width is unwound from a single reel 27 and subsequently the single continuous web 21 having a double width is cut longitudinally to obtain the two continuous webs 21 from a cutting device 29; preferably, downstream of the cutting device 29 (namely, after the longitudinal cut) the two continuous webs 21 are spaced apart transversally by a spacer device 30. Similarly, according to an alternative embodiment illustrated in Figure 7, a single continuous web 24 having a double width is unwound from a single reel 28 and subsequently the single continuous web 24 having a double width is cut longitudinally to obtain the two continuous webs 24 by a cutting device 29; preferably, downstream of the cutting device 29 (namely, after the longitudinal cut) the two continuous webs 24 are spaced apart transversally by a spacer device 30.

[0034] According to a preferred embodiment, the wrapping machine 6 comprises a trimming device 31 (illustrated in Figure 3) which trims (cuts) each pocket (namely each "*cartridge belt*") longitudinally on both sides to eliminate the excess lateral portions of the continuous webs 21 and 24 (lateral portions which are in excess in the final wraps 5 but are necessary to achieve adequate mutual adhesion of the two continuous webs 21 and 24 at the moment of the formation of the wraps 5).

[0035] Preferably, the continuous webs 21 and 24 are made of paper-based material (even if the wrapping machine 6 is perfectly capable of operating with continuous webs 21 and 24 made of plastic-based material). To obtain the union between the overlapping portions of the continuous webs 21 and 24 (namely, to be able to close the wraps 5) it is necessary to apply glue which is interposed between the overlapping portions of the continuous webs 21 and 24; consequently, the wrapping machine 6 comprises a gluing device 32 (illustrated in Figure 3) which can be arranged (alternatively) at the continuous web 21 to apply glue on the continuous web 21 or can be arranged at the continuous web 24 to apply glue on the continuous web 24. For completeness, Figure 3 illustrates two gluing devices 32 in two different positions, but it is clear that only one of the two gluing devices 32 is actually provided.

[0036] The embodiments described here can be combined with one another without departing from the scope of the present invention.

[0037] The wrapping machine 6 described above has numerous advantages.

[0038] Firstly, the wrapping machine 6 described above, by working on a double line, allows to maintain a high operating speed (measured as the number of straws 1 wrapped in a unit of time) without interruptions (namely, without unexpected stops) and, at the same time, to reduce defective wrap 5 to a minimum even when continuous webs 21 and 24 of paper-based wrapping material are used. This result is obtained due to the fact that by using two independent and side-by-side webs 21 and two independent and side-by-side webs 24 it is possible to reduce the mechanical stresses that occur in the webs 21 and 24 (particularly in the webs 21 when they have to deform to enter the sucking seats 20 of the wrapping drum 18) and therefore it is possible to substantially reduce (practically eliminate) the more or less partial tearing of a web 21 or 24. In fact, the continuous webs 21 and 24 of paper-based wrapping material are less flexible (namely, they are less able to absorb deformations without damage) compared to the similar continuous webs 21 and 24 made of plastic-based wrapping material and therefore, to avoid unwanted tears in the continuous webs 21 and 24 made of paper-based wrapping material, it is necessary to reduce the stresses (deformations) to which the continuous webs 21 and 24 made of paper-based wrapping material are subjected in use.

[0039] Furthermore, the wrapping machine 6 described above requires minimal modifications compared to an existing wrapping machine and is therefore simple, inexpensive, and compact to manufacture.

LIST OF FIGURE REFERENCE NUMBERS

[0040]

1 straw
2 flat end
3 pointed end
4 intermediate portion
5 wrap
6 wrapping machine
7 hopper
8 pick-up conveyor
9 rotation axis
10 corrugator drum
11 rotation axis
12 corrugator device
13 bending drum
14 rotation axis
15 folding elements
16 reject drum
17 rotation axis
18 wrapping drum
19 seats
20 rotation axis
21 continuous web of wrapping material
22 applicator drum
23 rotation axis
24 continuous web of wrapping material
25 output conveyor
26 cutting device
27 reel
28 reel
29 cutting device
30 spacer device
31 trimming device
32 gluing device
S1 input station
S2 transfer station
S3 transfer station

S4 transfer station
S5 transfer station
S6 feeding station
S7 feeding station
P path

Claims

1. A method for wrapping straws (1) comprising the steps of:

   advancing, by means of a preferably rotating wrapping conveyor (18) and along a wrapping path (P), two seats (20) that are arranged side by side and are each suitable for housing a straw (1);
   feeding, at a first feeding station (S6) arranged along the wrapping path (P), into each seat (20) a portion of a first continuous web (21) of wrapping material that is arranged folded in a "U" shape inside the seat (20) to define a pocket;
   transferring, at a transfer station (S5) arranged downstream of the first feeding station (S6) along the wrapping path (P), into each seat (20) a straw (1) that is placed inside a respective pocket; and
   feeding, at a second feeding station (S7) arranged downstream of the transfer station (S5) along the wrapping path (P), over each seat (20) a second continuous web (24) of wrapping material that closes each pocket containing a respective straw (1) thus completing the formation of a respective wrap (5);
   the wrapping method is **characterized by** comprising the step of feeding two first continuous webs (21) that are separated from one another and arranged side by side so that one first continuous web (21) is arranged at a right seat (20) and the other first continuous web (21) is arranged at a left seat (20) .

2. The wrapping method according to claim 1 and comprising the step of unwinding the two first continuous webs (21) from two first separate and independent reels (27).

3. The wrapping method according to claim 1 and comprising the steps of:

   unwinding a first continuous web (21) having a double width from a single first reel (27); and
   longitudinally cutting the first continuous web (21) having a double width in half to obtain the two first continuous webs (21) .

4. The wrapping method according to claim 3 and comprising the step of transversally spacing the first two continuous webs (21) after the longitudinal cut.

5. The wrapping method according to any one of the claims from 1 to 4 and comprising the step of feeding two second continuous webs (24) that are separated from one another and arranged side by side so that a second continuous web (24) is arranged at the right seat (20) and the other second continuous web (24) is arranged at the left seat (20).

6. The wrapping method according to claim 5 and comprising the step of unwinding the two second continuous webs (24) from two second separate and independent reels (28).

7. The wrapping method according to claim 5 and comprising the steps of:

   unwinding a second continuous web (24) having a double width from a single second reel (28); and
   longitudinally cutting the second continuous web (24) having a double width in half to obtain the two second continuous webs (24) .

8. The wrapping method according to claim 7 and comprising the step of transversally spacing the two second continuous webs (24) after the longitudinal cut.

9. The wrapping method according to any one of the claims from 1 to 8 and comprising the further step of longitudinally trimming each wrap (5) on both sides.

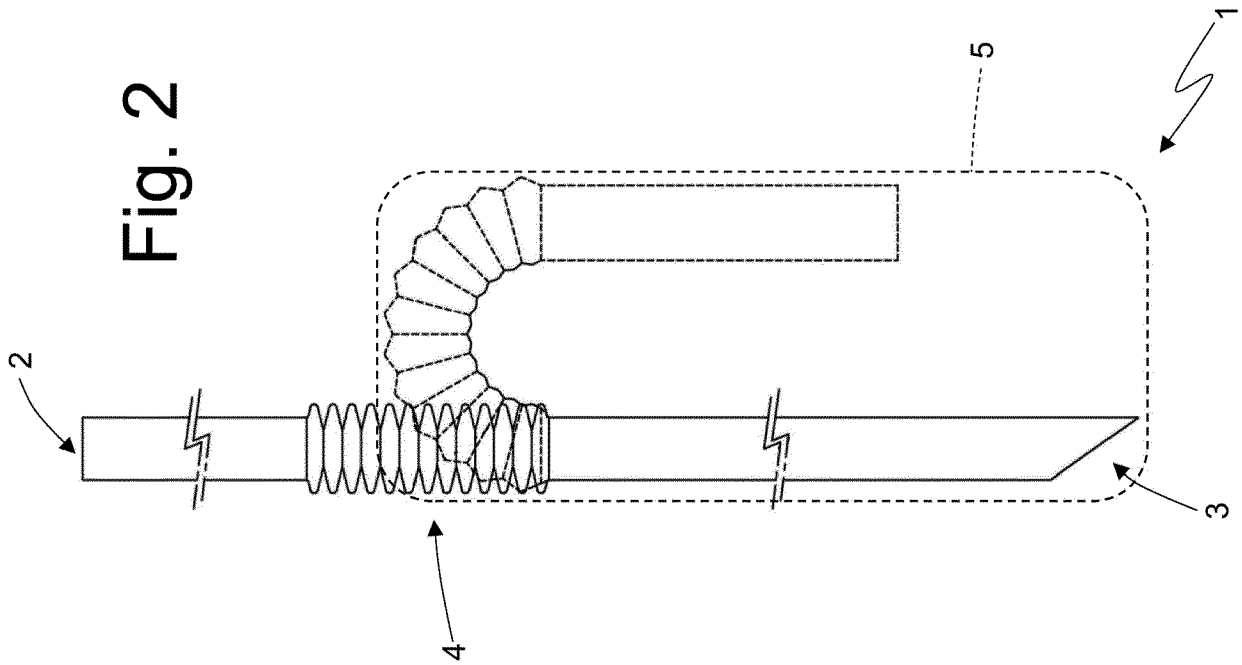
10. The wrapping method according to any one of the claims from 1 to 9, wherein the continuous webs (21, 24) are made of paper-based material.

11. A machine (6) for wrapping straw (1) comprising:

   a preferably rotating wrapping conveyor (18) configured to advance, along a wrapping path (P), two seats (20) that are arranged side by side and are each suitable for housing a straw (1);
   a first feeding station (S6) that is arranged along the wrapping path (P) and is configured to feed into each seat (20) a portion of a first continuous web (21) of wrapping material that is arranged folded in a "U" shape inside the seat (20) to define a pocket;
   a transfer station (S5) that is arranged downstream of the first feeding station (S6) along the wrapping path (P) and is configured to transfer into each seat (20) a straw (1) that is arranged inside a respective pocket; and
   a second feeding station (S7) that is arranged downstream of the transfer station (S5) along the wrapping path (P) and is configured to feed over each seat (20) a second continuous web

(24) of wrapping material that closes each pocket containing a respective straw (1) thus completing the formation of a respective wrap (5); the wrapping machine (6) is **characterized in that** the first feeding station (S6) is configured to feed two first continuous webs (21) that are separated from one another and arranged side by side so that one first continuous web (21) is arranged at a right seat (20) and the other first continuous web (21) is arranged at a left seat (20).

Fig. 2



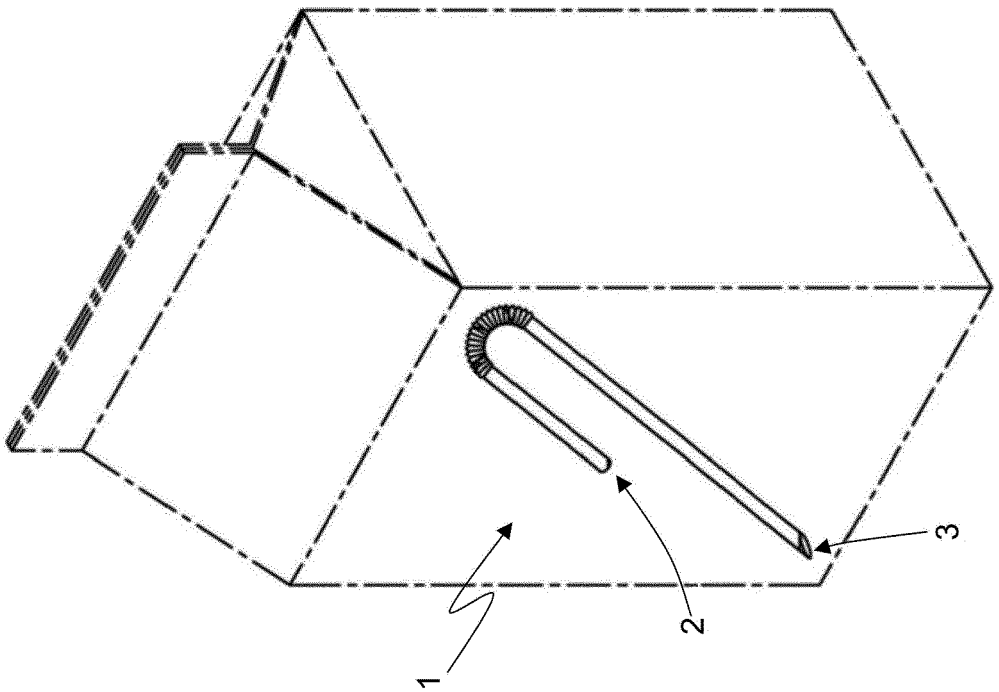


Fig. 1

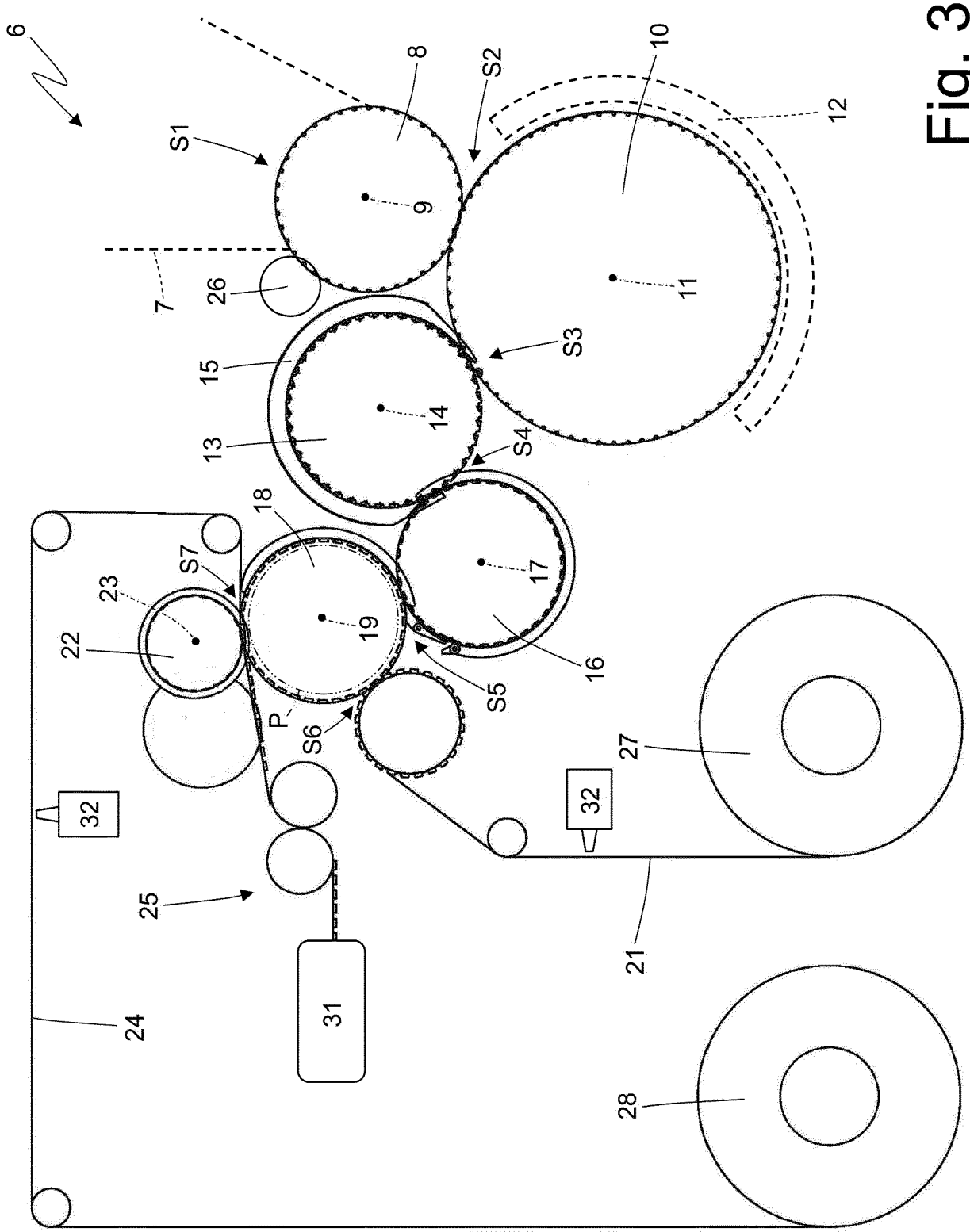

6
S1
8
S2
10
12
9
11
7
26
15
S3
14
13
S4
18
S7
17
23
19
22
16
S5
P
S6
32
27
32
25
21
31
24
28

Fig. 3

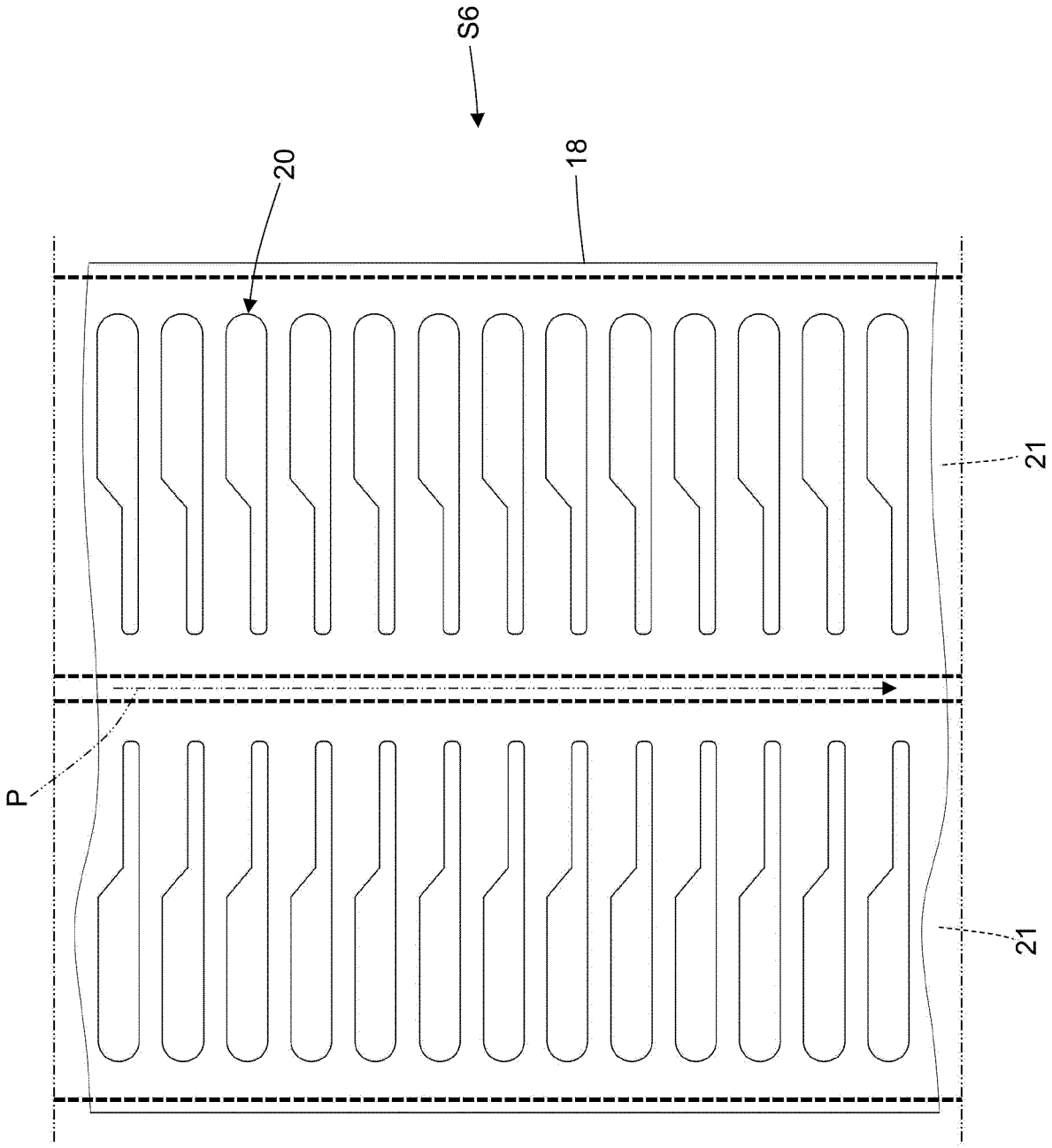


Fig. 4

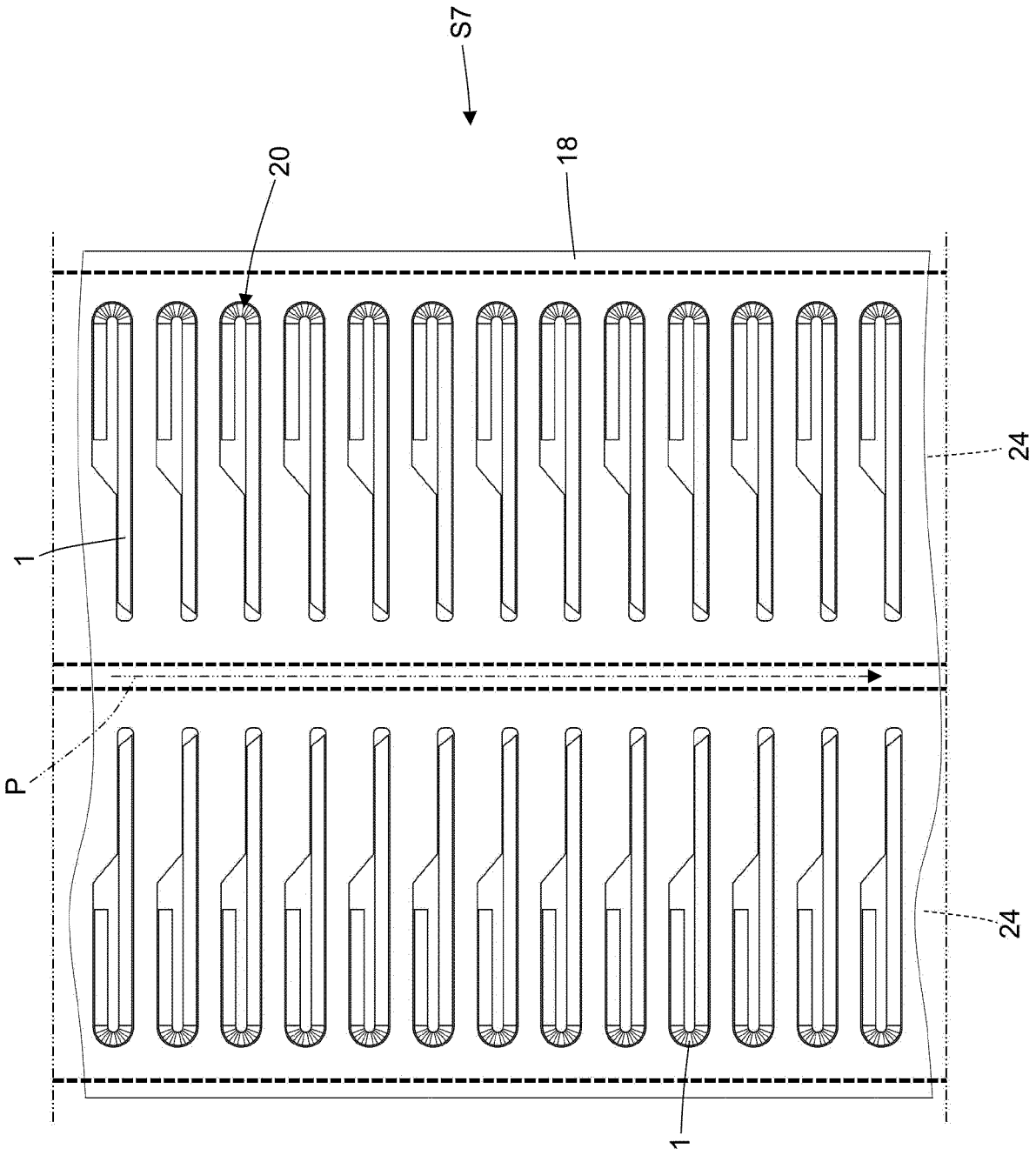


Fig. 5

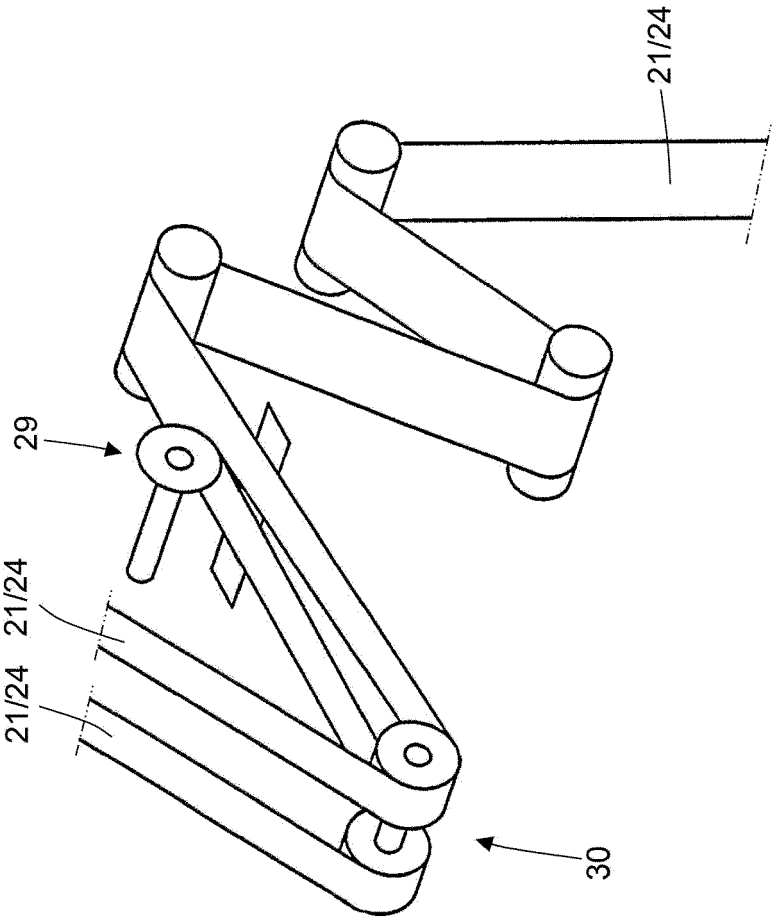


Fig. 7

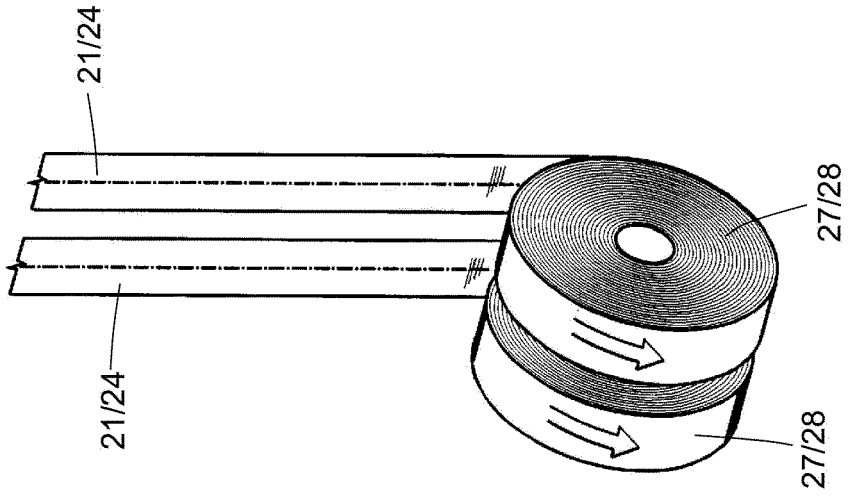


Fig. 6

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 24 16 0221

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2021/250715 A1 (IMA SPA [IT]) 16 December 2021 (2021-12-16) * abstract * * figures 1-8 * * page 15, line 13 * * page 16, line 11 - line 13 * * page 19, line 21 - line 22 *	1-11	INV. B65B19/34 B31D5/00 B65B9/04 B65B41/12
A	CN 115 429 086 A (ZHEJIANG JINSHEN MACHINERY MFT CO LTD) 6 December 2022 (2022-12-06) * abstract * * figure 5 *	1-11	

TECHNICAL FIELDS SEARCHED (IPC)

B65B
B31F
B31D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 September 2024	Damiani, Alberto

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 16 0221

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-09-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2021250715 A1	16-12-2021	EP 4164874 A1	19-04-2023
		US 2023256700 A1	17-08-2023
		WO 2021250715 A1	16-12-2021
CN 115429086 A	06-12-2022	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- IT 102023000003651 **[0001]**
- WO 2021250715 A1 **[0008]**